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EXAMINER

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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEVIN J. BAREFIELD
and RICHARD V. CAMPBELL

Appeal 2008-5809
Application 10/730,564
Technology Center 1700

Decided: December 17, 2008

Before EDWARD C. KIMLIN, ADRIENE LEPIANE HANLON, and
THOMAS A. WALTZ, *Administrative Patent Judges*.

HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from an Examiner's rejection of claims 11, 12, 20, and 21, all of the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

The following Examiner's rejections are before us for review:

Claims 11 and 12 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Flory¹ and Newton.²

Claims 20 and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Schimmeyer³ and Sugerman.⁴

The subject matter on appeal relates to a method for attaching an anchor to a region of strands on an end of a cable using a potting compound. The potting compound is applied with an injector that is clamped against the open end of the anchor. Claims 11 and 20 are the only independent claims on appeal. They read as follows:

11. A method for attaching an anchor having an internal passage and an open end to a region of strands on an end of a cable, comprising:
 - a. exposing said region of strands in said cable;
 - b. placing said region of strands within said internal passage of said anchor;
 - c. providing an injector, including
 - i. a sealing surface;
 - ii. a needle, extending from said sealing surface, having a first end proximate said sealing surface and a second end distal to said sealing surface;
 - iii. an injection orifice proximate said second end of said needle;

¹ US 5,611,636 issued to Flory on March 18, 1997.

² US 5,132,069 issued to Newton on July 21, 1992.

³ US 3,570,074 issued to Schimmeyer et al. on March 16, 1971.

⁴ US 2,604,362 issued to Sugerman et al. on July 22, 1952.

- d. clamping said injector against said open end of said anchor so that said needle protrudes into said region of strands and said sealing surface seals said open end of said anchor;
- e. providing a potting compound which transitions from a liquid state to a solid state over time;
- f. injecting said potting compound, in said liquid state, under pressure into said strand cavity through said injection orifice, so that said liquid potting compound infuses throughout said region of strands;
- g. withdrawing said needle while said potting compound is still in said liquid state; and
- h. allowing said liquid potting compound to harden into a solid, thereby locking said region of strands within said anchor.

20. A method for attaching an anchor having an internal passage and an open end to a region of strands on an end of a cable, comprising:

- a. exposing said region of strands in said cable;
- b. placing said region of strands within said internal passage of said anchor;
- c. providing an injector, including
 - i. a sealing surface;
 - ii. an injection orifice in said sealing surface;
- d. clamping said injector against said open end of said anchor so that said injection orifice is directed toward said

region of strands and said sealing surface seals said open end of said anchor;

e. providing a potting compound which transitions from a liquid state to a solid state over time;

f. injecting said potting compound, in said liquid state, under pressure into said strand cavity through said injection orifice, so that said liquid potting compound infuses throughout said region of strands; and

g. allowing said liquid potting compound to harden into said solid state, thereby locking said region of strands within said anchor.

Br. 15-17,⁵ Claims Appendix.

B. ISSUES

Issue 1: Have the Appellants shown that the Examiner reversibly erred in finding that the combined teachings of Flory and Newton suggest the step of “clamping said injector against said open end of said anchor so that said needle protrudes into said region of strands and said sealing surface seals said open end of said anchor” recited in claim 11?

Issue 2: Have the Appellants shown that the Examiner reversibly erred in finding that the combined teachings of Schimmeyer and Sugerman suggest the step of “clamping said injector against said open end of said anchor so that said injection orifice is directed toward said region of strands and said sealing surface seals said open end of said anchor” recited in claim 20?

⁵ Appeal Brief dated October 25, 2007.

C. FINDINGS OF FACT

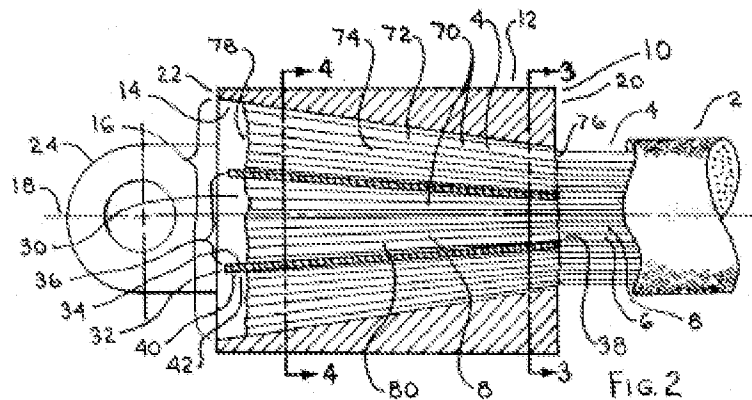
The following findings of fact are supported by a preponderance of the evidence. Additional findings of fact as necessary appear in the Analysis portion of the opinion.

1. Flory

The invention disclosed in Flory relates to an improved termination for the end of a cable or other flexible tension member in which the fibers are encapsulated in resinous material to form a plug within a socket cavity. Flory 1:14-18.

According to Flory, flexible tension members are commonly terminated in potted sockets. The fibers which comprise the tension member are untwisted or unbraided and then broomed or flared. The broomed fibers are placed within a tapered cavity in a potting socket barrel. There the fibers are filled, mixed, and encapsulated with a resinous material which then sets and hardens. The resulting fiber-and-resinous-material plug is essentially a composite material which resists pullout from the barrel cavity. Flory 1:23-31.

Flory Figure 2 is a longitudinal cross-section through a tapered socket illustrating tension-carrying elements broomed out and encapsulated within a resin. Flory 2:36-41. Figure 2 is reproduced below:



Flory Figure 2 depicts tension-carrying elements encapsulated within a resin in a tapered socket.

According to Flory, the term resinous material is intended to refer to any material which can be cast, poured, or injected in a liquid state and which will then set to a solid state. Flory 4:64-67.

2. Newton

Newton discloses a common method of molding composite articles comprising placing a structure of reinforcing fibers, such as glass, carbon, or aramid, into a mold and injecting a liquid resin into the mold so that it penetrates through the entire reinforcing structure. Newton 1:11-16.

A conventional arrangement for transferring resin from a resin injection machine into the fibers in a mold is illustrated in Newton Figure 1. Newton 1:20-23. Figure 1 is reproduced below:

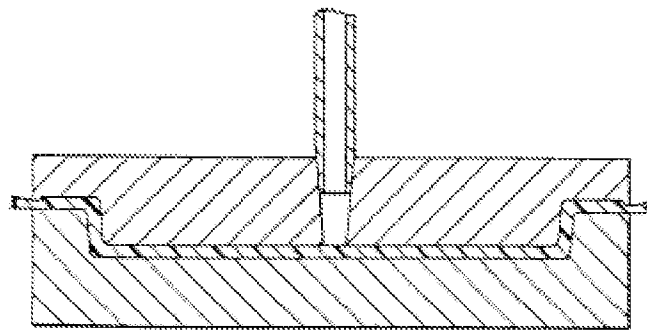


Fig.1.

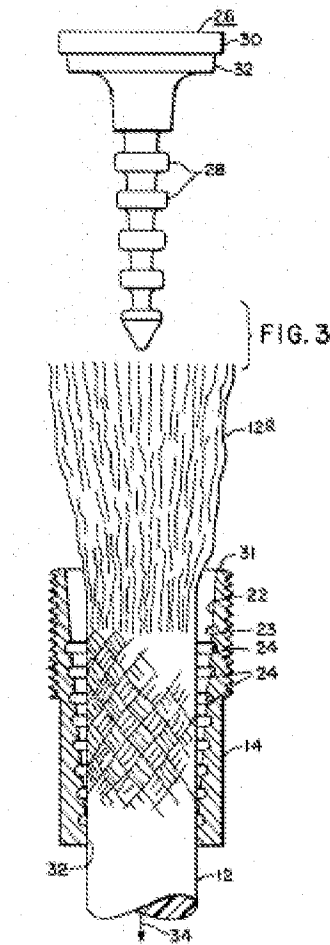
Newton Figure 1 depicts a mold in combination with an injection nozzle.

The nozzle from the resin injection machine is clamped to the injection port of the mold. Pressurized resin is fed from the injection machine and enters the reinforcing fibers at the injection port. Newton 1:23-26.

3. Schimmeyer

Schimmeyer discloses a rope end fitting structure comprising a tubular metal sleeve that encompasses the end portion of a rope. The metal sleeve is filled with a potting resin cured in situ to form a connection between the rope end and the metal sleeve. Schimmeyer 1:52-61.

Schimmeyer Figure 3 illustrates a rope end fitting structure. Schimmeyer 2:22-24. Figure 3 is reproduced below:



Schimmeyer Figure 3 depicts a rope end fitting structure.

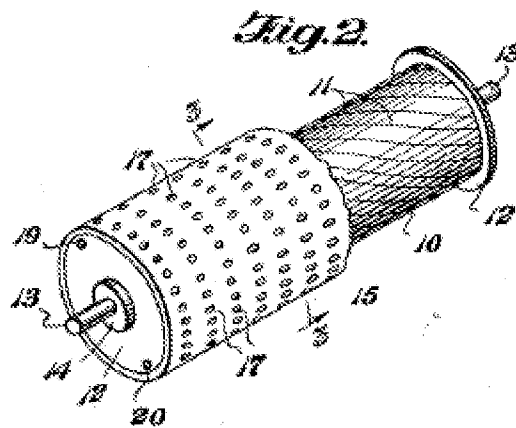
The rope end fitting structure comprises a rope 12 having an end portion 12a received in a tubular sleeve member 14. Schimmeyer 2:30-33.

The end portion **12a** of the rope is embedded in the sleeve member **14** by a suitable quantity of potting resin **25**, cured in situ to provide an integral bonded connection between the fibrous strands of the rope end **12a** and the sleeve member. Schimmeyer 2:43-47.

4. Sugerman

The invention disclosed in Sugerman relates to a method of fixing bristles by embedding the bristle ends in an adhesive substance. Sugerman 1:1-4.

Sugerman Figure 2 shows a core member with part of a frangible mold mounted thereon prior to adding the bristles and adhesive. Sugerman 1:49-51. Figure 2 is reproduced below:



Sugerman Figure 2 depicts a portion of a frangible mold.

The frangible mold **15** is perforated at **17** to provide holes through which bristles are firmly but temporarily mounted for adhesion to the core by subsequent casting. Sugerman 2:55-3:2.

The bristles **18** are firmly packed into each perforation **17** so that the holes are completely filled and to prevent exudation of fluid adhesive. Sugerman 2:3-7.

For purposes of introducing a fluid resin into the mold, one of the flanges **12** of the core is bored at **19** and **20**. The liquid resin is then introduced into the mold through one of the openings as **19** while the other opening as **20** serves as a vent to allow the air to be displaced from the mold by the liquid resin. Sugerman 3:36-42.

The hot or cold liquid resin is then poured or otherwise injected into the mold. Sugerman 3:43-44.

D. PRINCIPLES OF LAW

A claimed invention is not patentable if the subject matter of the invention would have been obvious to a person having ordinary skill in the art at the time the invention was made. 35 U.S.C. § 103(a); *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007); *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 13 (1966).

Facts relevant to a determination of obviousness include (1) the scope and content of the prior art, (2) any differences between the claimed invention and the prior art, (3) the level of skill in the art, and (4) any relevant objective evidence of obviousness or non-obviousness. *KSR*, 127 S. Ct. at 1734; *Graham*, 383 U.S. at 17-18.

A person of ordinary skill is not an automaton but is a person of ordinary creativity. *KSR*, 127 S. Ct. at 1742. One of ordinary skill in the art is presumed to have skills apart from what the prior art references expressly disclose. *In re Sovish*, 769 F.2d 738, 742 (Fed. Cir. 1985).

The test for obviousness is not that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to one of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Thus, where, as here, the rejection is based on a combination of references, the Appellants cannot show non-obviousness by attacking the references individually. *Id.* at 426.

E. ANALYSIS

1. Issue 1

The Examiner found that Flory teaches a method for attaching an anchor to a region of strands on the end of a cable. The Examiner found that the method includes the step of introducing a resinous material into an internal passage of the anchor so that the resinous material infuses throughout the region of strands. Ans. 3-4.⁶

Flory suggests that the resinous material may be introduced into the internal passage of the anchor by injection. Flory 4:64-67; Ans. 9. However, the Examiner found that Flory does not teach clamping an injector against the open end of the anchor whereby the sealing surface of the injector seals the open end of the anchor as recited in claim 11. Ans. 4.

The Examiner found that Newton teaches clamping an injector against the open end of a cavity so that the injector needle protrudes into a region of strands and the sealing surface of the injector seals the open end of the cavity. Ans. 4-5; Newton 1:23-26.

The Examiner concluded that it would have been obvious to one of ordinary skill in the art to seal the anchor of Flory with an injector as taught by Newton “to achieve the expected results that the resin would be more thoroughly and evenly distributed among the fiber materials with fewer voids, bubbles or capillary effects.” Ans. 5-6.

⁶ Examiner’s Answer mailed January 24, 2008.

The Appellants argue that the claimed method can be distinguished from Flory and Newton in several ways. First, the Appellants argue that Flory does not use the anchor as part of a sealed mold as required by the claims on appeal. Br. 6.⁷

The Examiner maintains that the claimed method is not distinguished from the prior art by its use of an anchor as a mold. In particular, the Examiner found that the anchor disclosed in the Appellants' Specification (element **18** in Figure 11) is substantially identical to the anchor of Flory (element **10** in Figure 2) which is also used as a mold. Ans. 9; Flory 4:55-62.

Based on the record before us, the Examiner's position is reasonable. The Appellants do not attribute enough structure and/or function to the anchor recited in claim 11 to distinguish it from the potted socket disclosed in Flory. Therefore, it is reasonable to conclude that the "anchor" recited in claim 11 includes the potted socket disclosed in Flory. *See In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) (during patent examination claims must be interpreted as broadly as their terms reasonably allow).

The Appellants also argue that none of the references discloses the step of clamping an anchor and injector together whereby the sealing surface of the injector seals the open end of the anchor. Br. 6.

The test for obviousness is what the *combined* teachings of the references would have suggested to one of ordinary skill in the art. *Keller*, 642 F.2d at 425.

⁷ The pages of the Appellants' Appeal Brief are not numbered. Therefore, we refer to specific pages of the Appellants' Appeal Brief using the numbering provided in the electronic file of Application 10/730,564.

The Examiner relied on Newton to establish that it was known in the art to clamp an injector to the open end of a mold. The Examiner relied on this teaching in Newton to establish that clamping an injector to the open end of the anchor of Flory would “achieve the expected results that the resin would be more thoroughly and evenly distributed among the fiber materials with fewer voids, bubbles or capillary effects.” Ans. 5-6.

The Appellants, however, argue that the Examiner’s proposed modification would render Flory’s anchor unsuitable for its intended purpose. In particular, the Appellants argue that the anchor disclosed in Flory includes at least one attachment lug **24** that extends outward from the surface of the anchor to allow the anchor to be attached to a fixed point or another object. *See* Flory Figure 2. The Appellants argue that the attachment lug would need to be removed from the anchor before a seal between the anchor and an injector could be created. However, the Appellants contend that removing the attachment lug would destroy the intent, purpose, and function of Flory’s anchor. Br. 8.

The Appellants’ argument is not persuasive of reversible error. First, Flory discloses that attachment lugs are optional. Flory 4:7-9; Ans. 11. Second, it is not readily apparent from the teachings of Flory that the attachment lugs are attached to the potting socket when the cavity is injected or otherwise filled with resin. *See* Flory 4:36-5:32.

2. Issue 2

The Appellants recognize that the Examiner relies on Sugerman for its teaching of the claimed injection steps. There is no dispute that Sugerman discloses that resin may be injected into the mold through bores **19** or **20** in flange **12**. Br. 9; Sugerman 3:43-44. Rather, the Appellants argue that

Sugerman does not teach the step of clamping an injector against the open end of the mold. Br. 9.

To the extent that Sugerman does not expressly disclose this step, we find that the teachings of Sugerman in combination with the skill in the art reasonably suggest clamping the injector against the open end of the mold. In particular, the Examiner found that the use of clamped molds and injection of resin is conventional in the art. Ans. 10. The Appellants have failed to establish otherwise. Indeed, the mold in Sugerman is constructed to accommodate a seal between the injector and the mold opening. Sugerman 3:38-42 (opening **20** serves as a vent to allow the air to be displaced from the mold by the liquid resin). Finally, we find that clamping the injector to the mold in Sugerman would have been known to provide many benefits, such as even distribution of resin with fewer voids, bubbles or capillary effects. Ans. 6.

Next, the Appellants argue that “significant modification” of Schimmeyer’s pin **26** would be required for it to function as an “injector.” Br. 9. Significantly, the Examiner is not proposing to modify pin **26** to function as an injector. Ans. 12.

Finally, the Appellants argue that Sugerman is not analogous art because it is outside the field of the inventors’ endeavor and is not reasonably pertinent to the inventors’ particular problem. Specifically, the Appellants argue that Sugerman relates to the field of hairbrush manufacturing and is concerned with attaching bristles to the body of a hairbrush. On the other hand, the Appellants argue that their invention relates to the field of cables and ropes and their particular problem relates to

infusing strands of a cable with potting compound to form a termination at the end of a cable. Br. 10-11.

The Appellants' have defined their field of endeavor and their particular problem too narrowly. Both the Appellants' invention and the invention disclosed in Sugerman relate to affixing strands to the interior of a mold surface by injecting a resinous material into the mold. *See* Spec. 2:2-5⁸; Sugerman 3:15-49. Thus, it is reasonable to find that Sugerman is "analogous art."

Moreover, even if Sugerman were from a different field of endeavor, we find that injecting a resinous material into a mold to affix strands therein is no more than the predictable use of prior art elements according to their established functions. *KSR*, 127 S. Ct. at 1740.

F. CONCLUSIONS OF LAW

The Appellants have not shown that the Examiner reversibly erred in finding that the combined teachings of Flory and Newton suggest the step of "clamping said injector against said open end of said anchor so that said needle protrudes into said region of strands and said sealing surface seals said open end of said anchor."

The Appellants have not shown that the Examiner reversibly erred in finding that the combined teachings of Schimmeyer and Sugerman suggest the step of "clamping said injector against said open end of said anchor so

⁸ The Appellants define the term "strand" to describe the constituents of synthetic cables, natural-fiber cables, and ropes. Spec. 2:9-10. The Appellants define the term "potting compound" as referring to any liquid that can be transformed into a solid. Examples of "potting compound" include thermoplastics and thermosets. Spec. 2:21-3:1.

that said injection orifice is directed toward said region of strands and said sealing surface seals said open end of said anchor.”

G. DECISION

The rejection of claims 11 and 12 under 35 U.S.C. § 103(a) as unpatentable over the combination of Flory and Newton is affirmed.

The rejection of claims 20 and 21 under 35 U.S.C. § 103(a) as unpatentable over Schimmeyer and Sugerman is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a) (2008).

AFFIRMED

Appeal 2008-5809
Application 10/730,564

PL Initial:

sld

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